WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electrical Code (ANSI C1) and/or any other requirements which may be applicable to the user.

Installation, operation, and maintenance should be performed only by qualified personnel.

TM-111025U-1

VOLUME 1

OPERATOR'S MANUAL

626-PA-6008 TEMPERATURE AND HUMIDITY MONITOR

NOTE

Refer to Volume 2 (Service Manual) of TM-111025U for maintenance data.

1 May 1984
(Rev. 1 July 1984)
(Rev. 1 Sept. 1985)
(Rev. 1 May 1986)
(Rev. 1 Sept. 1989)
(Rev. B)

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DRANETZ

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IMPORTANT! CALIBRATION INTERVAL

The recommended calibration interval for this unit is once every 12 MONTHS.

We recommend that you return the unit to the factory for calibration. If you decide to do so, first contact the Dranetz Customer Service Department to obtain an authorization number.

Telephone Number:	(201) 287-3680
Telex Number:	499-7808
TWX Number:	(710) 997-9553
FAX Number:	(201) 248-9240
Cable:	DRANETZ

Then fill out the Repair/Service Order form enclosed in this manual and ship it along with the unit to the Dranetz Customer Service Department. (If this form is missing, ask the Dranetz Customer Service Department for a replacement.)

STATEMENT OF WARRANTY

ALL PRODUCTS OF DRANETZ TECHNOLOGIES, INC. ARE WARRANTED TO THE ORIGINAL PURCHASER AGAINST DEFECTIVE MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF DELIVERY. DRANETZ WILL REPAIR OR REPLACE, AT ITS OPTION, ALL DEFECTIVE EQUIPMENT RETURNED, FREIGHT PREPAID, DURING THE WARRANTY PERIOD, WITHOUT CHARGE FOR REPAIR, PROVIDED THERE IS NO EVIDENCE THAT THE EQUIPMENT HAS BEEN MISHANDLED OR ABUSED. THIS WARRANTY SHALL NOT APPLY TO ANY DEFECTS RESULTING FROM IMPROPER OR INADEQUATE MAINTENANCE, BUYER-SUPPLIED HARDWARE/SOFTWARE OR INTERFACING, UNAUTHORIZED MODIFICATION OR MISUSE OF THE EQUIPMENT, OPERATION OUTSIDE OF THE ENVIRONMENTAL SPECIFICATIONS FOR THE PRODUCT, OR IMPROPER SITE PREPARATION OR MAINTENANCE.

The information in this manual has been reviewed and is believed to be entirely reliable. No responsibility, however, is assumed for any inaccuracies. The material in this manual is for information purposes only, and is subject to change without notice.

VOLUME 1
OPERATOR'S MANUAL

626-PA-6008 TEMPERATURE AND HUMIDITY MONITOR

SECTION I
GENERAL INFORMATION

1.1 SCOPE

This manual consists of two volumes. Volume 1, the Operator's manual, consists of three sections: I) GENERAL INFORMATION, II) INSTALLATION AND OPERATION, and III) OPERATIONAL TEST. Volume 2, the Service manual, contains the maintenance instructions (Sections IV thru VII).

1.2 INTRODUCTION

This manual provides operating instructions for the 626-PA-6008 Temperature and Humidity Monitor Plug-in, hereinafter referred to as the 6008. The 6008 is designed for installation in the Series 626 Universal Disturbance Analyzer. It is assumed that the reader is familiar with the mainframe information described in Volume 1 of the Mainframe manual.

1.3 PURPOSE

The 6008 is a 2-channel module which monitors temperature and humidity. One channel monitors temperature from 0 to 100 degrees C; the other channel monitors relative humidity from 0 to 100% relative humidity (RH). With thresholds programmed by the user, the 6008 stores, analyzes, classifies and prints out quantitative and qualitative disturbance data. Accompanying the data is a printout of time derived from a highly accurate crystal-controlled 24-hour clock in the mainframe.

The 6008 monitors changes in any of these parameters, based on user programmable sensitivities and high and low limits. Each input takes eight readings over a 20-second period and then averages the readings to determine if a threshold or limit crossing has occurred. The sensitivity value of each type of disturbance, above which detection and printout occurs, is operator programmable. The time spent out of the user-programmable limits is also accumulated on a daily basis and made available from the data summary printouts. Except for an automatic summary printout at the end of each day, disturbance data is normally printed out only when disturbances occur. In an alternate mode, a disturbance summary printout occurs only at the end of each day. This feature permits long term unattended operation.

The threshold program may be easily altered, using the front panel switches. Cueing indicators adjacent to the programming switches

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simplify the programming procedure. A back-up program for the plug-in, stored in hard memory at the factory, may always be recalled upon operator demand. Both the program and the disturbance data in the data accumulators may be printed out upon demand.

1.4 EQUIPMENT CHARACTERISTICS

The 6008 is configured as a plug-in module 6.5" high by 1.25" wide by 10" deep. It is designed for installation in any one of the five slots of the Series 626 Universal Disturbance Analyzer. Technical specifications of the 6008 are listed in Table 1-1.

Table 1-1

626-PA-6008 Specifications

Input Temperature	
Range:	1 to 100 deg C
Accuracy:	+/- 1 deg C
Cable Length:	100 ft max (30.5 m)
Cable Temperature:	105 deg C max
Input Relative Humidity	
Range:	0 to 80%* RH for $0 \leq T \leq 70^{\circ}C$
Accuracy:	+/- 3% RH +/- .05 $(\bar{t}-20)$ +/- .02 reading
Cable Length:	100 ft max (30.5 m)
Cable Temperature:	105 deg C max
Programmable Parameters	
Temperature	
Low limit	0 deg C min
High limit	102 deg C max
Sensitivity	1 deg C min max
Preset to	LO = 20, HI = 30, SENS = 2
Humidity	
Low limit	0% RH
High limit	102% RH
Sensitivity	1% RH min
Preset to	LO = 40, HI = 60, SENS = 5

---

* Note additional drift above 80% RH. (See figure 1-1.)

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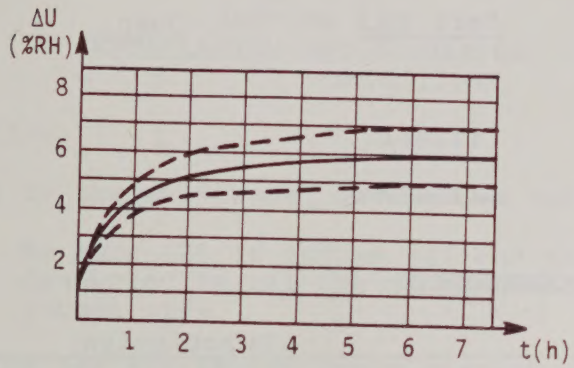
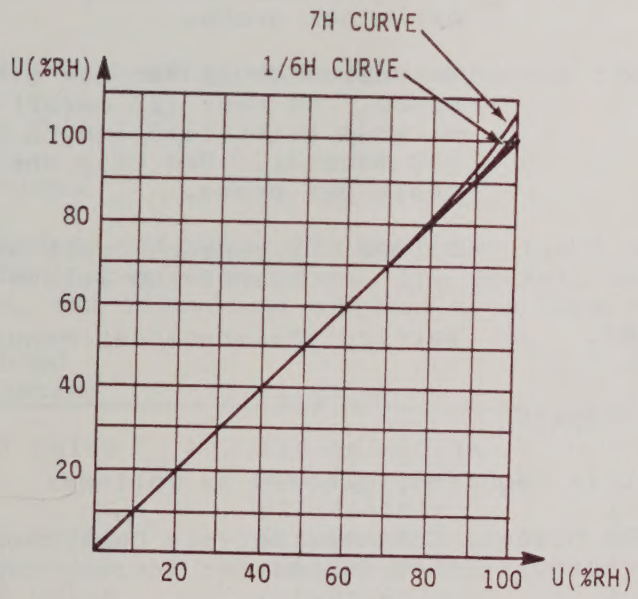


ADDITIONAL ERROR FOR EXTENDED
TIME SPENT > 95% RH



DRIFT DUE TO EXTENDED TIME
AT HIGH HUMIDITY

NOTE: UNIT SHOULD BE CALIBRATED AFTER SEVERAL HOURS AT HIGH HUMIDITY IF IS INTENDED TO BE USED IN THIS MANNER.

Figure 1-1. Effect of High Humidity on Drift

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1.5 STANDARD ACCESSORIES

Model No.	Part No.	Quan.	Description
626-PA-6008, Vol. 1	TM-111025U	1	Operating Manual
	111061	1	Humidity Probe
	111059	1	Temperature Probe

1.6 OPTIONAL ACCESSORIES

Part No.	Description
111055	Extension cable for use with Humidity Probe. 90 foot (27 meter) cable extends total lead length to 100 feet (30 meters). Use only one extension cable per probe.
111056-G2	Extension cable for use with Temperature Probe. 90 foot (27 meter) cable extends total lead length to 100 feet (30 meters). Use only one extension cable per probe.
	111058 Extension cable set combines 1 each 111055 AND 111056-G2.
TM-111025U, Vol. 2	Service (Maintenance) Manual

1.7 FACTORY REPAIR

When factory repair is required, proceed as follows:

1. Contact the Dranetz Customer Service Department in order to obtain an Authorization Number for factory repair.

   Telephone No: (201) 287-3680

   TWX: (710) 997-9553

   FAX: (201) 248-9240

   Telex: 499-7808

   Cable: DRANETZ

2. Fill out the REPAIR/SERVICE ORDER form enclosed in the Series 626 Operating Manual and ship it with the malfunctioning equipment to the Dranetz Customer Service Department.

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SECTION II
INSTALLATION AND OPERATION

2.1 INSTALLATION

To install the 6008 in the mainframe, proceed as follows:

CAUTION: Be sure 626 is turned off and that all power connected to all the plug-in modules is turned off.

a. Position the top and bottom front corners of the plug-in module in the upper and lower tracks at the desired slot position at the rear of the mainframe.

b. Carefully slide the module into the mainframe until it is firmly seated.

c. Tighten the top and bottom captive screws to secure the module to the mainframe.

2.1.1 Load Ratings

The Series 626 standard mainframe has an upper limit of the combined total rating of the installed modules. The overall mainframe capacity is set at 20 units, and individual modules have load ratings as follows:

Plug-in	Load Rating	Plug-in	Load Rating
626-PA-6001	2 Units	626-PA-60012A	3 Units
626-PA-6001 with Extra Option Board	3 Units	626-PA-6013	2 Units
		626-PA-6014	1 Unit
		626-PA-6015	4 Units
626-PA-6002	2 Units	626-PA-6018	4 Units
626-PA-6003	4 Units	626-PA-6020	4 Units
626-PA-6005	2 Units	626-PA-6024A	4 Units
626-PA-6006	2 Units	626-PA-6024B	4 Units
626-PA-6007	1 Unit	626-PA-6025	4 Units
626-PA-6008	2 Units	626-PA-6030	6 Units
626-PA-6009	4 Units	626-PA-6037	1 Unit
626-PA-6011	1 Unit	626-PA-6038	1 Unit
626-PA-6012	2 Units	626-PA-6040	6 Units

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NOTE

When selecting modules for installation into any Series 626 Mainframe, verify that the sum of the load ratings of the installed modules DOES NOT exceed 20 Units.

2.2 CONNECTING THE SENSOR PROBES TO THE MODULE

CAUTION

To avoid damaging the equipment, do not connect or disconnect the probes while the 626 is turned on.

2.2.1 Connection Procedure

The 6008 is supplied with two connectors on the rear panel. The 6-contact connector is used for the Humidity Probe (DTI P/N 111067) and the 3-contact connector is used for the Temperature Probe (DTI P/N 111059). Proceed as follows:

a. Insert key in FUNCTION key switch on the front panel of the mainframe and set switch to OFF position.

b. Attach the connectors on the two probes to the appropriate rear panel connectors.

2.2.2 Applications

The Humidity Probe can be taped in place, held with strips of Velcro, or hung using tie wraps with eyelets. The Temperature Probe can be hung with its metal clip taped in place, or fastened, using the included tie wraps.

Computer Specifications:

Computer manufacturers are more commonly paying attention to temperature and humidity within the computer room. One major manufacturer makes the following recommendations:

Temperature:	Minimum: 18°C (65°F)
	Maximum: 24°C (75°F)
Humidity:	Minimum: 40% R.H.
	Maximum: 60% R.H.

Specifications from individual companies should be available on request, from their Service departments. The 626-PA-6008 may then be programmed to match.

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2.3 OPERATING THE 6008

2.3.1 Operating Controls and Indicators

The functions of the mainframe operating controls and indicators associated with the 6008 are described in Table 2-1. Figure 2-1 shows the Series 626 controls associated with a 6008. For a description of controls common to overall Series 626 operation, refer to Volume 1 of the Mainframe manual.

Table 2-1. 6008 Operating Controls

Item	Function
INPUT pushbutton	Used to select temperature or humidity programming
LO LIMIT pushbutton	When depressed, enables the numeric keyboard to program low limit for temperature or humidity.
HI LIMIT pushbutton	When depressed, enables the numeric keyboard to program high limit for either input.
SENS pushbutton	When depressed, enables numeric keyboard to program sensitivity for either input.
NUMERIC pushbuttons	When single lamp lights, user is cued to press a "0" or "1" for temperature or humidity input, respectively. Also used to enter numerical values for other functions.
ENTER pushbutton	When depressed, transfers numeric keyboard values into 6008 memory for processing.
DATA pushbutton	When depressed, produces data summary printout.
PROG pushbutton	When depressed, produces a program summary printout.
PRESET pushbutton	With FUNCTION switch set to PROGRAM and a channel switch (1-5) depressed, depressing PRESET switch recalls non-volatile factory program for that input.

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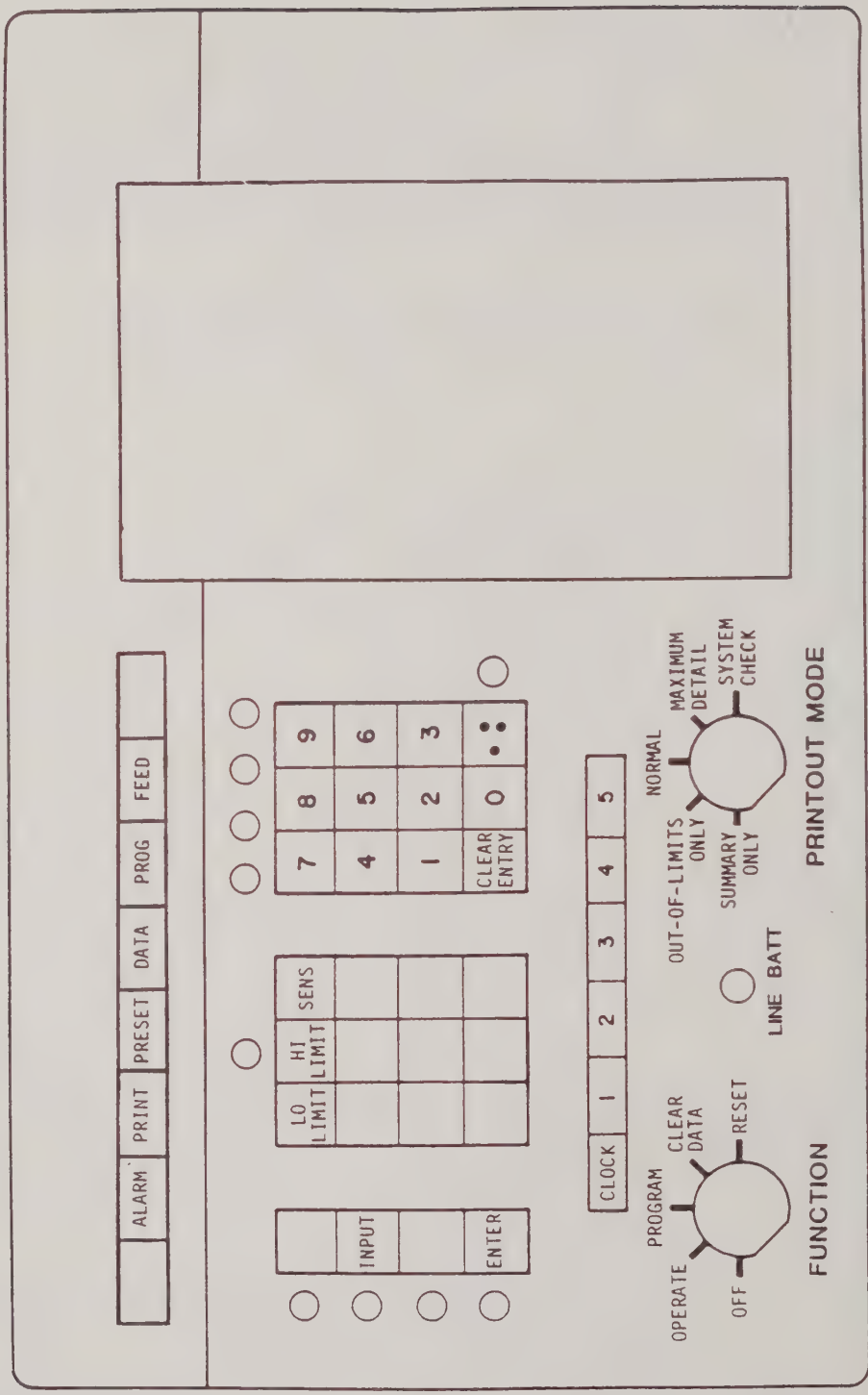

Figure 2-1. Series 626 Controls Used by the 6008 Plug-In

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2.3.2 Programming Procedure

Assume it is desired to program a temperature high limit of 35 deg C, a low limit of 15 deg C, and a sensitivity of 3 deg C. In addition, the humidity input is to be programmed for a high limit of 75%, a low limit of 35% and a sensitivity of 10%.

For the example cited, program the 6008 as follows:

a. Set FUNCTION switch to PROGRAM.

b. Depress the channel pushbutton (1-5) that corresponds to the slot position of the plug-in to be programmed. Note that a program summary for that channel is immediately printed.

c. Note that the red LED next to the INPUT pushbutton is lit. Press the INPUT pushbutton. Note that the following prompt message is printed and a single yellow LED is lit.

	626	626A,G,R,ARA	
↑	1 FOR HUMIDITY 0 FOR TEMPERATURE ENTER:	ENTER: 0 FOR TEMPERATURE 1 FOR HUMIDITY	↓

d. Depress a "0" or "1", depending on which input you wish to change. Note that the green LED adjacent to the ENTER key is lit, waiting for the ENTER key to be depressed.

(assume a "0" was depressed for the following example)

e. When the ENTER indicator goes out, an indicator above the center bank of pushbuttons lights. This indicates that one of the functions (HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed. At this time the PRESET button could also be depressed to change all of the parameters for temperature and humidity to the factory-preset values.

f. Depress the HI LIMIT pushbutton.

g. Note that three yellow LEDS above the numeric keyboard are now lit. Enter 035, using the keyboard. If an error is made, depress CLEAR ENTRY and then the correct entry. Note that the leading zero for numbers less than 100 must be entered.

h. When the value is entered, the lamp next to the ENTER pushbutton lights. Depress this pushbutton to enter the value.

i. Repeat steps c through h for the low limit value (015), using the LO LIMIT pushbutton.

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j. Repeat steps c through h for the sensitivity value (Ø3), using the SENS pushbutton. Note that only two yellow LEDs light in step g.

k. The same sequence is used to change the humidity input, except a "1" is entered instead of a "Ø" in step c.

l. The completed program printout should take the following form:

626	626A,G,R,ARA
HIGH LIMIT Ø75	PROGRAM SUMMARY
LOW LIMIT Ø35	CH 2
SENS Ø1Ø	626-PA-6ØØ8
HUMIDITY	
↑ HIGH LIMIT Ø35	TEMPERATURE
LOW LIMIT Ø15	SENS ØØ3
SENS ØØ3	LOW LIMIT Ø15
TEMPERATURE	HIGH LIMIT Ø35 ↓
	HUMIDITY
626-PA-6ØØ8	SENS Ø1Ø
CH2	LOW LIMIT Ø35
PROGRAM SUMMARY	HIGH LIMIT Ø75

NOTE

The instrument is designed to detect an invalid entry. For example, if the high limit value is selected as 3Ø deg C, and the user selects a low limit value of 35 deg C, the following printout will appear.

626	626A,G,R,ARA
↑ HI LIMIT Ø3Ø	LO LIMIT Ø29
LO LIMIT Ø29	HI LIMIT Ø3Ø ↓

m. When the plug-in program is completed, the user may proceed to program another module (by depressing another channel number) or he (she) may place the instrument on line by setting the FUNCTION switch to OPERATE. While on line, the program currently in effect may be obtained by simply depressing the PROG pushbutton.

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2.4 SELECTING THE FACTORY/OPTION 101 PRESET PROGRAM

Note: Custom Preset Option 101 allows the user to choose his/her own program for the PRESET function.

To select the program stored in non-volatile memory, set the FUNCTION switch to PROGRAM and depress the channel member desired. The last operator-set program will be printed out. Now depress the PRESET pushbutton to recall the factory-set program. Unless specially modified to customer requirements, the factory-set program for the 6008 is as follows:

626	626A,G,R,ARA
HIGH LIMIT 075	PROGRAM SUMMARY
LOW LIMIT 025	CH 5
SENS 005	626-PA-6008
HUMIDITY	
	TEMPERATURE
↑ HIGH LIMIT 030	SENS 004 ↓
LOW LIMIT 020	LOW LIMIT 015
SENS 002	HIGH LIMIT 035
TEMPERATURE	
	HUMIDITY
626-PA-6008	SENS 007
	LOW LIMIT 015
HIGH LIMIT 050	HIGH LIMIT 050
LOW LIMIT 015	
SENS 007	626-PA-6008
HUMIDITY	
	TEMPERATURE
HIGH LIMIT 035	SENS 002
LOW LIMIT 015	LOW LIMIT 020
SENS 004	HIGH LIMIT 030
TEMPERATURE	
	HUMIDITY
626-PA-6008	SENS 005
CH 5	LOW LIMIT 025
PROGRAM SUMMARY	HIGH LIMIT 075

2.5 DESCRIPTION OF DATA PRINTOUTS

When any of the disturbances described below is detected by the 6008, it is recorded and displayed in characteristic manner.

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2.5.1 Over Limit for Temperature or Humidity

An over limit condition exists when the monitored averaged value of temperature or humidity exceeds the user-specified upper limit for the respective input. An over limit condition is indicated by a printout such as the following:

```
4T HI 10:47:12.98
      or
4H HI 10:47:09.76
```

where the 4 is the channel number, the T is for temperature, the H is for humidity, and the time is given in hours, minutes and seconds (to 0.01 sec resolution).

When the temperature or humidity recovers to normal, a printout such as the following occurs:

626	626A,G,R,ARA
4T NOR 10:55:13.77	073.3 DEG C MAX
↑ 073.3 DEG C MAX	4T NOR 10:55:13.77 ↓
or	or
4H NOR 11:12:34.21	065.5 % RH MAX
065.5 % RH MAX	4H NOR 11:12:34.21

indicating when the normal temperature or humidity was restored and the value of the highest temperature or humidity reached during the over limit interval.

2.5.2 Under Limit for Temperature or Humidity

An under limit condition exists when the monitored temperature or humidity goes below the user-specified lower limit. An under limit condition is indicated by a printout such as the following:

```
4T LO 13:33:23.78
   or
4H LO 12:59:00.01
```

When the temperature or humidity returns to normal, a message such as the following is printed:

626	626A,G,R,ARA
4T NOR 13:44:56.98	003.1 DEG C MIN
↑ 003.1 DEG C MIN	4T NOR 13:44:56.98 ↓
or	or
4H NOR 12:59:58.99	024.2 % RH MIN
024.2 % RH MIN	4H NOR 12:59:58.99

indicating when the normal condition was restored and the value of the lowest temperature or humidity reached during the under limit interval.

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2.5.3 Temperature or Humidity Change

A temperature or humidity printout is triggered when the temperature or humidity changes more than a preselected amount from the last printed value. The change sensitivity is a user selected value, selected independently for temperature or humidity. The following examples show several temperature and humidity changes. The first shows a humidity increase; the second printout shows a temperature decrease. In each case, the time of each increase or decrease is also shown.

626	626A,G,R,ARA
2T DEC Ø1:22:34.76	Ø87.3 % RH
Ø13.3 DEG C	2H INC Ø1:23:55.32
2H INC Ø1:23:55.32	Ø13.3. DEG C
Ø87.3 % RH	2T DEC Ø1:22:34.76

The following example printouts show how various settings of the PRINTOUT MODE switch change the amount of detail in the printed record of a disturbance. It is assumed that the disturbances occurred in Channel 2 and that the limits for Channel 2 were programmed as follows:

T LOW LIMIT	2Ø DEG C
T HIGH LIMIT	3Ø DEG C
T SENSIVITY	Ø2 DEG C
H LOW LIMIT	25 % RH
H HIGH LIMIT	75 % RH
H SENSITIVITY	Ø5 % RH

Disturbances which occur while the PRINTOUT MODE switch is in the SUMMARY ONLY position do not generate individual printouts but they are stored in the daily accumulator and are automatically printed each day at midnight (worst case event and number of occurrences in each category). This printout may also be triggered manually by depressing the DATA button. The following is an example of a DATA summary:

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626

```
TIME= 0000.6 MIN    time spent HI for humidity
MAX  102.1 % RH     max humidity value for day
HIGH  001 HT        number of high excursions
TIME= 0001.0 MIN    time spent LO for humidity
MIN  000.1 % RH     min. humidity value for day
LOW   002 HT        number of low excursions
PRES=070.4 % RH     present humidity level
   HUMIDITY
TIME= 0002.2 MIN    (same as above, except
MAX  032.8 DEG C       for temperature)
HIGH  003 HT
TIME= 0032.4 MIN
MIN  018.5 DEG C
LOW   020 HT
PRES=031.4 DEG C
  TEMPERATURE

  626-PA-6008
      CH2

10/17/83   10:48:15
   DATA SUMMARY

2T NOR 12:56.38.51     Printout of over limit
   078.2 DEG C         in OUT-OF-LIMITS ONLY mode

2T HI 12:56:34.52

2H NOR 03:55:45.98
   013.5 % RH

2H INC 03:53:34.89
   024.8 % RH

2H INC 03:50:57.67     Printout of under limit
   019.3 % RH          in NORMAL mode.

2H DEC 03:40.11.23
   013.5 % RH

2H DEC 03:39:45.33
   021.1 % RH

2H LO 03:39:45.33
```


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626A,G,R,ARA

```
2H LO Ø3:39:45.33

   Ø21.1 % RH
2H DEC Ø3:39:45.33

   Ø13.5 % RH
2H DEC Ø3:40:11.23

   Ø19.3 % RH
2H INC Ø3:50:57.67

   Ø24.8 % RH
2H INC Ø3:53:34.89

   Ø13.5 % RH
2H NOR Ø3:55:45.98

2T HI 12:56:34.52

   Ø78.2 DEG C
2T NOR 12:56:38.51

   DATA SUMMARY
1Ø/17/83   1Ø:48:15

       CH2
  626-PA-6ØØ8

  TEMPERATURE
PRES=Ø31.4 DEG C
LOW    Ø2Ø HT
MIN   Ø18.5 DEG C
TIME= ØØ32.4 MIN
HIGH  ØØ3 HT
MAX   Ø32.8 DEG C
TIME= ØØØ2.2 MIN
   HUMIDITY
PRES=Ø7Ø.4 % RH
LOW   ØØ2 HT
MIN   ØØØ.1 % RH
TIME= ØØØ1.Ø MIN
HIGH   ØØ1 HT
MAX   1Ø2.1 % RH
TIME= ØØØØ.6 MIN
```

Printout of under limit in NORMAL mode.

Printout of over limit in OUT-OF-LIMITS ONLY mode.

present temperature level
number of low excursions
min. temperature value for day
time spent LO for temperature
number of high excursions
maximum temperature value for day
time spent HI for temperaturer

(same as above, except for humidity)

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2.6 SHORT TERM ACCUMULATOR

If disturbances should take place at a rate faster than the 626 mainframe can process and print them out (and the internal event stack memory should overflow), then subsequent events until the overflow condition is cleared, are stored in summary form in the Short Term Accumulators. These values are cleared out after the printout of the Short Term Accumulators is complete. The format is identical to the Data Summary except there are no accumulated time values, and the values are printed out only when a HI or LO limit was crossed to expedite the printing.

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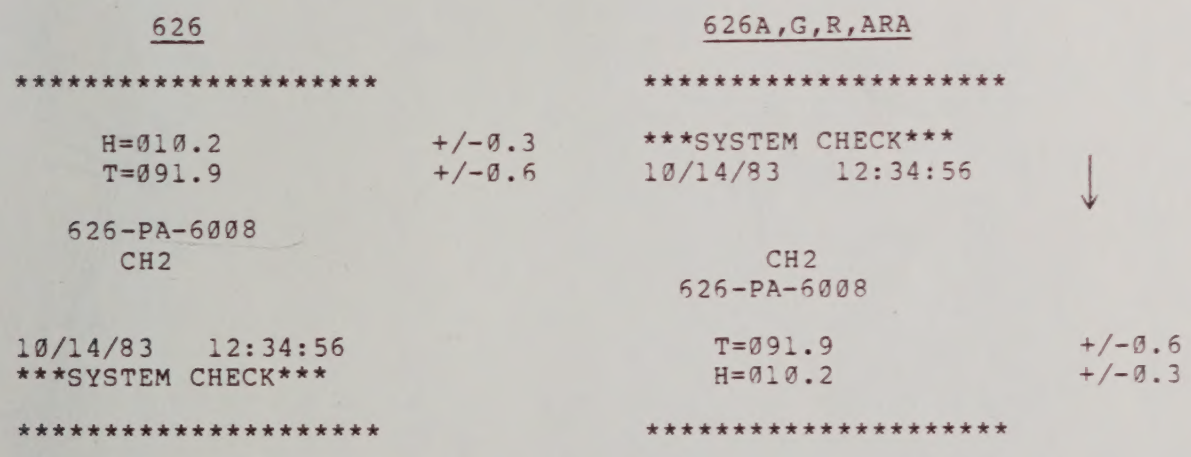
SECTION III
OPERATIONAL TEST

3.1 GENERAL

This section provides information for performing an operational test to verify that the 6008 plug-in is operating properly.

3.2 SYSTEM CHECK

When the PRINTOUT mode switch is set to SYSTEM CHECK, the precision reference signals are applied to the measuring circuitry. The probe inputs are disconnected during this time. These signals verify the functionality of the module, but not the actual sensors. The sensors can be checked by use of a calibrated standard (for temperature, a precise temperature chamber; and for humidity, a low and high end calibration salt bath). The allowable tolerance levels are shown below, along with a sample printout:



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